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EXAMINER	
TORRES, JUAN A	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

SK

Office Action Summary	Application No.	Applicant(s)	
	10/747,931	SAMUELI ET AL.	
	Examiner	Art Unit	
	Juan A. Torres	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/04/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 04/04/2005 and on 04/11/2005 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "34" and "108" have both been used to designate A/D; reference characters "66" and "106" have both been used to designate a complex multiplier; reference characters "65" and "110" have both been used to designate Fixed Oscillator 120 MHz (see specification page 17 lines 1-2).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because exceed 150 words in length. Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities:

a) The recitation "stages 46 designated as a "Symbol Recovery Loop" and" in page 6 line 23 is improper (see figure 1); it is suggested to be changed to "stages 48 designated as a "Symbol Recovery Loop" and".

b) The recitation "corresponding to the converter 108 in FIG. 2" in page 14 line 1 is improper (see figures 2 and 3); it is suggested to be changed to "corresponding to the converter 108 in FIG. 3".

Appropriate correction is required.

Examiner NOTE

The submission of the 37 CFR 1.31 rule filed on 4-8-2002 in the parent case Serial Number 09/013964 (now US 6714608), disqualifying Ben-Efraim (US 5995563 A) as prior art has been taking into account by the Examiner.

The Examiner has applied the same rule to Ben-Efraim (US 5870439 A); Ben-Efraim (US 5844948 A); and Ben-Efraim (US 5812927 A), because they have the same or later filing date.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 32, 33, 35 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishikawa (US 5418815 A).

As per claim 32, Ishikawa discloses a method of recovering information from a received signal comprising receiving a carrier signal modulated with an information signal (figure 13 block 1 column 9 lines 36-44); sampling the received signal to generate at least one digital signal (figure 13 blocks 404 and 405 column 13 lines 25-56); processing the at least one digital signal to generate trigonometric function signals associated with the at least one digital signal (figure 13 blocks 421, 407, 408 and 411 column 14 lines 40-62); processing the at least one digital signal by regulating, in accordance with the trigonometric function signals, a frequency at which at least one

processed digital signal is generated (figure 13 blocks 411, 412, 417, 418, 422, 423 and 424 column 15 line 58 to column 16 line 9); and processing the at least one processed digital signal to generate an output signal representative of the information signal (figure 13 blocks 421, 407, 408 and 409 column 14 lines 29-39).

As per claim 33, Ishikawa discloses claim 32. Ishikawa also discloses that the regulating comprises complex multiplying the at least one digital signal with the trigonometric function signals to generate the at least one processed digital signal (figure 13 blocks 421, 407, 408 and 411 column 14 lines 40-62).

As per claim 35, Ishikawa discloses claim 32. Ishikawa also discloses that the regulating is performed by a carrier recovery loop (figure 13 blocks 411, 412, 417, 418, 422, 423 and 424 column 15 line 58 to column 16 line 9).

As per claim 38, Ishikawa discloses claim 32. Ishikawa also discloses downconverting the received signal using a second fixed frequency oscillator to generate at least one downconverted signal (figure 13 blocks 401-403 column 13 lines 34-44), where sampling the received signal comprises sampling the at least one downconverted signal (figure 13 blocks 401-405 column 13 lines 25-56).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-6, 9, 12, 13, 15, 17, 19, 21-23 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa (US 5418815 A) in view of Inkol (US 5504455 A).

As per claim 2, Ishikawa discloses a method of recovering information from a received signal comprising receiving a carrier signal modulated with an information signal (figure 13 block 1 column 9 lines 36-44); downconverting the carrier signal using a first fixed frequency oscillator to generate at least one downconverted signal (figure 13 blocks 401-403 column 13 lines 34-44); sampling the at least one downconverted signal using a second frequency oscillator to generate at least one digital signal (figure 13 blocks 404 and 405 column 13 lines 25-56); and processing the at least one digital signal to generate an output signal representative of the information signal (figure 13 blocks 421, 407, 408 and 409 column 14 lines 29-39). Ishikawa doesn't disclose that the second frequency oscillator is fixed. Inkol discloses that the second frequency oscillator is fixed (figure 1 blocks 26 and 28 column 6 lines 51-59). Ishikawa and Inkol are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the fixed oscilator disclosed by Inkol in the reception technique disclosed by Ishikawa. The suggestion/motivation for doing so would have been to reduce the complexity of the oscillator (Inkol column 7 lines 3-7).

As per claim 3, Ishikawa and Inkol disclose claim 2. Ishikawa also discloses that the at least one downconverted signal is at least one baseband signal (figure 13 blocks 401-403 column 13 lines 57-62).

As per claim 4, Ishikawa and Inkol disclose claim 2. Ishikawa also discloses that the at least one downconverted signal is an IF signal (figure 13 blocks 3-4 column 13 lines 25-33).

As per claim 5, Ishikawa and Inkol disclose claim 2. Ishikawa also discloses in-phase and quadrature signals (figure 13 blocks 401-403 column 13 lines 57-62).

As per claim 6, Ishikawa and Inkol disclose claim 2. Ishikawa also discloses complex multiplying the at least one digital signal with at least one signal (figure 13 block 408 column 14 lines 29-39).

As per claim 9, Ishikawa and Inkol disclose claim 2. Ishikawa also discloses regulating, by a carrier recovery loop, a frequency at which the output signal is generated (figure 13 blocks 411, 412, 417, 418, 422, 423 and 424 column 15 line 58 to column 16 line 9).

As per claim 12, Ishikawa discloses a method of recovering information from a received signal comprising receiving a carrier signal modulated with an information signal (figure 13 block 1 column 9 lines 36-44); and processing the at least one IF signal to generate an output signal representative of the information signal (figure 13 blocks 421, 407, 408 and 409 column 14 lines 29-39). Ishikawa doesn't disclose subsampling the carrier signal using a fixed frequency oscillator to generate at least one digital IF signal. Inkol discloses subsampling the carrier signal using a fixed frequency oscillator to generate at least one digital IF signal (figure 2 block 42 column 7 lines 13-35). Ishikawa and Inkol are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to

a person of ordinary skill in the art to incorporate the fixed oscilator disclosed by Inkol in the reception technique disclosed by Ishikawa. The suggestion/motivation for doing so would have been to reduce the number of components in the system (column 7 lines 13-35).

As per claim 13, Ishikawa and Inkol disclose claim 12. Ishikawa also discloses complex multiplying the at least one digital signal with at least one signal to generate at least one multiplied signal (figure 13 block 408 column 14 lines 29-39).

As per claim 15, Ishikawa and Inkol disclose claim 12. Ishikawa also discloses regulating, by a carrier recovery loop, a frequency at which the output signal is generated (figure 13 blocks 411, 412, 417, 418, 422, 423 and 424 column 15 line 58 to column16 line 9).

As per claim 17, Ishikawa discloses a method of recovering information from a received signal comprising receiving a carrier signal modulated with an information signal (figure 13 block 1 column 9 lines 36-44); complex multiplying at least one digital signal with at least one signal to generate at least one multiplied signal (figure 13 block 408 column 14 lines 29-39); and processing the at least one multiplied signal to generate an output signal representative of the information signal (figure 13 blocks 421, 407, 408 and 409 column 14 lines 29-39). Ishikawa doesn't disclose sampling the received signal using a first fixed frequency oscillator to generate at least one digital signal. Inkol discloses sampling the received signal using a first fixed frequency oscillator to generate at least one digital signal (figure 2 block 42 column 7 lines 13-35). Ishikawa and Inkol are analogous art because they are from the same field of endeavor

of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the fixed oscilator disclosed by Inkol in the reception technique disclosed by Ishikawa. The suggestion/motivation for doing so would have been to reduce the number of components in the system (column 7 lines 13-35).

As per claim 19, Ishikawa and Inkol disclose claim 17. Ishikawa also discloses that complex multiplying comprises a portion of operations performed by a carrier recovery loop that regulates a frequency at which the output signal is generated (figure 13 blocks 411, 412, 417, 418, 422, 423 and 424 column 15 line 58 to column16 line 9).

As per claim 21, Ishikawa and Inkol disclose claim 17. Ishikawa also discloses downconverting the received signal using a second fixed frequency oscillator to generate at least one downconverted signal (figure 13 blocks 401-403 column 13 lines 34-44), where sampling the received signal comprises sampling the at least one downconverted signal (figure 13 blocks 401-405 column 13 lines 25-56).

As per claim 22, Ishikawa and Inkol disclose claim 21. Ishikawa also discloses that the at least one downconverted signal is at least one baseband signal (figure 13 blocks 401-403 column 13 lines 57-62).

As per claim 23, Ishikawa and Inkol disclose claim 17. Ishikawa also discloses that the at least one downconverted signal is an IF signal (figure 13 blocks 3-4 column 13 lines 25-33).

As per claim 32, Ishikawa discloses a method of recovering information from a received signal comprising receiving a carrier signal modulated with an information signal (figure 13 block 1 column 9 lines 36-44);
sampling the received signal to generate at least one digital signal; processing the at least one digital signal to generate trigonometric function signals associated with the at least one digital signal; processing the at least one digital signal by regulating, in accordance with the trigonometric function signals, a frequency at which at least one processed digital signal is generated; and processing the at least one processed digital signal to generate an output signal representative of the information signal

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa (US 5418815 A) as applied to claim 32 above, and further in view of Inkol (US 5504455 A). As per claim 37, Ishikawa discloses claim 32. Ishikawa doesn't disclose sampling the received signal using a fixed frequency oscillator. Inkol discloses sampling the received signal using a fixed frequency oscillator (figure 1 blocks 26 and 28 column 6 lines 51-59). Ishikawa and Inkol are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the fixed oscilator disclosed by Inkol in the reception technique disclosed by Ishikawa. The suggestion/motivation for doing so would have been to reduce the complexity of the oscillator (Inkol column 7 lines 3-7).

Claims 24-27 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa (US 5418815 A) in view of Becker (US 5504785 A) (see Applicants Admitted prior art in page 17 lines 8-29).

As per claim 24, Ishikawa discloses a method of recovering information from a received signal comprising receiving a carrier signal modulated with an information signal (figure 13 block 1 column 9 lines 36-44); sampling the received signal to generate at least one digital signal (figure 13 blocks 404 and 405 column 13 lines 25-56); complex multiplying the at least one digital signal with at least one signal to generate at least one multiplied signal (figure 13 block 408 column 14 lines 29-39); and processing the at least one regulated signal to generate an output signal representative of the information signal (figure 13 blocks 421, 407, 408 and 409 column 14 lines 29-39). Ishikawa doesn't disclose regulating a sampling time associated with the at least one multiplied signal to generate at least one regulated signal. Becker discloses regulating a sampling time associated with the at least one multiplied signal to generate at least one regulated signal (figure 1 block 50 column 5 lines 33-46). Ishikawa and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 25, Ishikawa and Becker disclose claim 24. Becker also discloses performing variable interpolation (figure 1 block 50 column 5 lines 33-46). Ishikawa and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 26, Ishikawa and Becker disclose claim 24. Ishikawa also discloses that complex multiplying comprises a portion of operations performed by a carrier recovery loop that regulates a frequency at which the output signal is generated (figure 13 blocks 411, 412, 417, 418, 422, 423 and 424 column 15 line 58 to column16 line 9).

As per claim 27, Ishikawa and Becker disclose claim 24. Becker also discloses regulating, by a symbol recovery loop, a sampling time associated with the output signal (figure 1 block 60 column 6 line 63 to column 7 line 9). Ishikawa and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital

resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 29, Ishikawa and Becker disclose claim 24. Ishikawa also discloses downconverting the received signal using a fixed frequency oscillator to generate at least one downconverted signal (figure 13 blocks 401-403 column 13 lines 34-44), where sampling the received signal comprises sampling the at least one downconverted signal (figure 13 blocks 404 and 405 column 13 lines 25-56).

As per claim 30, Ishikawa and Becker disclose claim 29. Ishikawa also discloses that the at least one downconverted signal comprises at least one baseband signal (figure 13 blocks 401-403 column 13 lines 57-62).

As per claim 31, Ishikawa and Becker disclose claim 24. Ishikawa also discloses that the at least one digital signal comprises at least one IF signal (figure 13 blocks 3-4 column 13 lines 25-33).

Claims 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa as applied to claim 32 above, and further in view of Becker (US 5504785 A) (see Applicants Admitted prior art in page 17 lines 8-29).

As per claim 34, Ishikawa discloses claim 32. Ishikawa doesn't disclose performing variable interpolation. Becker discloses performing variable interpolation (figure 1 block 50 column 5 lines 33-46). Ishikawa and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa the interpolation technique

disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 36, Ishikawa and Becker disclose claim 32. Becker also discloses regulating, by a symbol recovery loop, a sampling time associated with the output signal (figure 1 block 60 column 6 line 63 to column 7 line 9). Ishikawa and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46)

Claims 7, 8, 10, 11, 14, 16, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa and Inkol as applied to claims 2 above, and further in view of Becker (US 5504785 A) (see Applicants Admitted prior art in page 17 lines 8-29).

As per claim 7, Ishikawa and Inkol disclose claim 2. Ishikawa and Inkol don't disclose performing variable interpolation operations. Becker discloses performing variable interpolation operations (figure 1 block 50 column 5 lines 33-46). Ishikawa, Inkol and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a

person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 8, Ishikawa and Inkol disclose claim 2. Ishikawa also discloses complex multiplying the at least one digital signal with at least one signal to generate at least one multiplied signal (figure 13 block 408 column 14 lines 29-39). Ishikawa and Inkol don't disclose performing variable interpolation operations. Becker discloses performing variable interpolation operations (figure 1 block 50 column 5 lines 33-46). Ishikawa, Inkol and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 10, Ishikawa and Inkol disclose claim 2. Ishikawa and Inkol don't disclose regulating, by a symbol recovery loop, a sampling time associated with the output signal. Becker discloses regulating, by a symbol recovery loop, a sampling time associated with the output signal (figure 1 block 60 column 6 line 63 to column 7 line 9). Ishikawa, Inkol and Becker are analogous art because they are from the same field of

endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to recover the timing and align the digital samples with the symbols encoded into the baseband (Becker column 7 lines 1-9).

As per claim 11, Ishikawa and Inkol disclose claim 2. Ishikawa also discloses regulating, by a carrier recovery loop, which the output signal is generated (figure 13 block 408 column 14 lines 29-39). Ishikawa and Inkol don't disclose regulating, by a symbol recovery loop, associated with the output signal, a frequency at a sampling time. Becker discloses regulating, by a symbol recovery loop, associated with the output signal,1 a frequency at a sampling time (figure 1 block 50 column 5 lines 33-46). Ishikawa, Inkol and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 14, Ishikawa and Inkol disclose claim 13. Ishikawa and Inkol don't disclose performing variable interpolation on the at least one multiplied signal. Becker discloses performing variable interpolation on the at least one multiplied signal (figure 1

block 50 column 5 lines 33-46). Ishikawa, Inkol and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 16, Ishikawa and Inkol disclose claim 12. Ishikawa and Inkol don't disclose regulating, by a symbol recovery loop, a sampling time associated with the output signal. Becker discloses regulating, by a symbol recovery loop, a sampling time associated with the output signal (figure 1 block 60 column 6 line 63 to column 7 line 9). Ishikawa, Inkol and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to recover the timing and align the digital samples with the symbols encoded into the baseband (Becker column 7 lines 1-9).

As per claim 18, Ishikawa and Inkol disclose claim 17. Ishikawa and Inkol don't disclose performing variable interpolation. Becker discloses performing variable interpolation (figure 1 block 50 column 5 lines 33-46). Ishikawa, Inkol and Becker are analogous art because they are from the same field of endeavor of quadrature

demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to satisfy the Nyquist sampling criterion and to ensure that the digital resampled signal is time position locked to the baseband signal (Becker column 5 lines 33-46).

As per claim 20, Ishikawa and Inkol disclose claim 17. Ishikawa and Inkol don't disclose regulating, by a symbol recovery loop, a sampling time associated with the output signal. Becker discloses regulating, by a symbol recovery loop, a sampling time associated with the output signal (figure 1 block 60 column 6 line 63 to column 7 line 9). Ishikawa, Inkol and Becker are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the technique disclosed by Ishikawa and Inkol the interpolation technique disclosed by Becker. The suggestion/motivation for doing so would have been to recover the timing and align the digital samples with the symbols encoded into the baseband (Becker column 7 lines 1-9).

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa and Becker as applied to claim 24 above, and further in view of Inkol (US 5504455 A). As per claim 28, Ishikawa and Becker disclose claim 24. Ishikawa and Becker don't disclose that the sampling comprises sampling the received signal using a fixed frequency oscillator. Inkol discloses that the sampling comprises sampling the received

signal using a fixed frequency oscillator (figure 1 blocks 26 and 28 column 6 lines 51-59). Ishikawa, Becker and Inkol are analogous art because they are from the same field of endeavor of quadrature demodulators. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the fixed oscilator disclosed by Inkol in the reception technique disclosed by Ishikawa and Becker. The suggestion/motivation for doing so would have been to reduce the complexity of the oscillator (Inkol column 7 lines 3-7).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsuchiya (US 4608540 A) discloses a phase-shift keying (PSK) demodulator for demodulating signals modulated by a so called PSK system including a DPSK system, which modulates the phase of a carrier with a data comprising a digital signal. Chalmers (US 5640416 A) discloses digitally sampling the spread spectrum signal at an IF frequency and simultaneously despreading and downconverting the signal to baseband. Chalmers (US 5375146 A) discloses digital frequency conversion and tuning scheme for microwave radio receivers and transmitters. Duong (US 5511235 A) discloses detecting a signaling channel during scanning including a controlled frequency converter circuit and a controlled filter bandwidth.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is 571-272-3119. The examiner can normally be reached on 8-6 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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02-20-2007

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